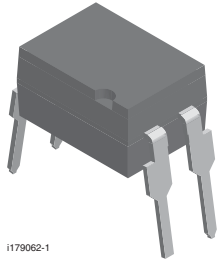
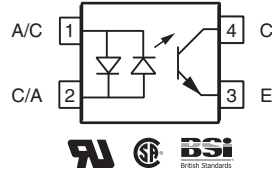


# Optocoupler, Phototransistor Output, AC Input, 5300 V<sub>RMS</sub>



i179062-1



## FEATURES

- High current transfer ratios
  - at 5 mA: 50 to 600 %
  - at 1.0 mA: 45 % typical (> 13)
- Low CTR degradation
- Good CTR linearity depending on forward current
- Isolation test voltage, 5300 V<sub>RMS</sub>
- High collector emitter voltage, V<sub>CEO</sub> = 70 V
- Low saturation voltage
- Fast switching times
- Temperature stable
- Low coupling capacitance
- End stackable, 0.100" (2.54 mm) spacing
- High common mode interference immunity (unconnected base)
- SMD option, see SFH620A, SFH6206 datasheet
- Material categorization: for definitions of compliance please see [www.vishay.com/doc?99912](http://www.vishay.com/doc?99912)


**RoHS**  
COMPLIANT

## DESCRIPTION

The SFH620AA, SFH620AGB features a high current transfer ratio, low coupling capacitance and high isolation voltage. These couplers have a GaAs infrared emitting diode emitter, which is optically coupled to a silicon planar phototransistor detector, and is incorporated in a plastic DIP-4 package.

The coupling devices are designed for signal transmission between two electrically separated circuits.

The couplers are end-stackable with 2.54 mm lead spacing. This version complies with IEC 60950 (DIN VDE 0805) for reinforced insulation up to an operation voltage of 400 V<sub>RMS</sub> or DC.

## AGENCY APPROVALS

- UL1577, file no. E52744 system code H, double protection
- CSA 93751
- BSI IEC 60950; IEC 60065
- VDE 0884-5, DIN EN 60747-5-5, available with option 1

ORDERING INFORMATION												
S F H 6 2 0 A x x						- X 0 0 1						
PART NUMBER						PACKAGE OPTION						
AGENCY CERTIFIED/PACKAGE	CTR (%)		± 5 mA									
UL, CSA, BSI	50 to 600		100 to 600									
DIP-4	SFH620AA		SFH620AGB									
VDE, UL, CSA, BSI	50 to 600		100 to 600									
DIP-4	-		SFH620AGB-X001									

ABSOLUTE MAXIMUM RATINGS (T <sub>amb</sub> = 25 °C, unless otherwise specified)				
PARAMETER	TEST CONDITION	SYMBOL	VALUE	UNIT
<b>INPUT</b>				
DC forward current		I <sub>F</sub>	± 60	mA
Surge forward current	t <sub>p</sub> ≤ 1.0 μs	I <sub>FSM</sub>	± 2.5	A
Total power dissipation		P <sub>diss</sub>	100	mW
<b>OUTPUT</b>				
Collector emitter voltage		V <sub>CE</sub>	70	V
Emitter collector voltage		V <sub>EC</sub>	7	V
Collector current		I <sub>C</sub>	50	mA
	t <sub>p</sub> ≤ 1.0 ms	I <sub>C</sub>	100	mA
Power dissipation		P <sub>diss</sub>	150	mW



ABSOLUTE MAXIMUM RATINGS ( $T_{amb} = 25\text{ }^{\circ}\text{C}$ , unless otherwise specified)				
PARAMETER	TEST CONDITION	SYMBOL	VALUE	UNIT
<b>COUPLER</b>				
Isolation test voltage between emitter and detector		$V_{ISO}$	5300	$V_{RMS}$
Creepage distance			$\geq 7$	mm
Clearance distance			$\geq 7$	mm
Insulation thickness between emitter and detector			$\geq 0.4$	mm
Comparative tracking index per DIN IEC 112/VDE 0303 part 1		CTI	$\geq 175$	
Isolation resistance	$V_{IO} = 500\text{ V}$ , $T_{amb} = 25\text{ }^{\circ}\text{C}$	$R_{IO}$	$\geq 10^{12}$	$\Omega$
	$V_{IO} = 500\text{ V}$ , $T_{amb} = 100\text{ }^{\circ}\text{C}$	$R_{IO}$	$\geq 10^{11}$	$\Omega$
Storage temperature		$T_{stg}$	-55 to +150	$^{\circ}\text{C}$
Ambient temperature		$T_{amb}$	-55 to +100	$^{\circ}\text{C}$
Junction temperature		$T_j$	100	$^{\circ}\text{C}$
Soldering temperature <sup>(1)</sup>	max. 10 s, dip soldering distance to seating plane $\geq 1.5\text{ mm}$	$T_{slid}$	260	$^{\circ}\text{C}$

**Notes**

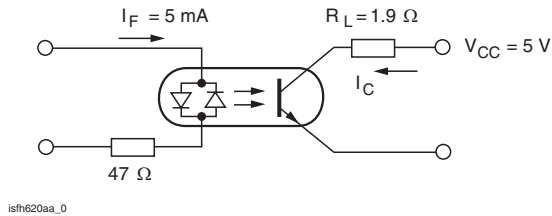
- Stresses in excess of the absolute maximum ratings can cause permanent damage to the device. Functional operation of the device is not implied at these or any other conditions in excess of those given in the operational sections of this document. Exposure to absolute maximum ratings for extended periods of the time can adversely affect reliability.
- <sup>(1)</sup> Refer to reflow profile for soldering conditions for surface mounted devices (SMD). Refer to wave profile for soldering conditions for through hole devices (DIP).

ELECTRICAL CHARACTERISTICS ( $T_{amb} = 25\text{ }^{\circ}\text{C}$ , unless otherwise specified)							
PARAMETER	TEST CONDITION	PART	SYMBOL	MIN.	TYP.	MAX.	UNIT
<b>INPUT</b>							
Forward voltage	$I_F = \pm 60\text{ mA}$		$V_F$		1.25	1.65	V
Capacitance	$V_R = 0\text{ V}$ , $f = 1\text{ MHz}$		$C_O$		50		pF
Thermal resistance			$R_{thja}$		750		K/W
<b>OUTPUT</b>							
Collector emitter capacitance	$V_{CE} = 5\text{ V}$ , $f = 1\text{ MHz}$		$C_{CE}$		6.8		pF
Thermal resistance			$R_{thja}$		500		K/W
<b>COUPLER</b>							
Collector emitter saturation voltage	$I_F = \pm 10\text{ mA}$ , $I_C = 2.5\text{ mA}$		$V_{CEsat}$		0.25	0.4	V
Coupling capacitance			$C_C$		0.2		pF
Collector emitter leakage current	$V_{CE} = 10\text{ V}$	SFH620AA	$I_{CEO}$		10	100	nA
		SFH620AGB	$I_{CEO}$		10	100	nA

**Note**

- Minimum and maximum values are testing requirements. Typical values are characteristics of the device and are the result of engineering evaluation. Typical values are for information only and are not part of the testing requirements.

CURRENT TRANSFER RATIO ( $T_{amb} = 25\text{ }^{\circ}\text{C}$ , unless otherwise specified)							
PARAMETER	TEST CONDITION	PART	SYMBOL	MIN.	TYP.	MAX.	UNIT
$I_C/I_F$	$I_F = \pm 5\text{ mA}$ , $V_{CE} = 5\text{ V}$	SFH620AA	CTR	50		600	%
		SFH620AGB		100		600	%


 Fig. 1 - Switching Times (Typical Values)  
 Linear Operation (Saturated)

<b>SWITCHING CHARACTERISTICS</b> ( $T_{amb} = 25\text{ }^{\circ}\text{C}$ , unless otherwise specified)						
PARAMETER	TEST CONDITION	SYMBOL	MIN.	TYP.	MAX.	UNIT
Turn-on time	$I_F = \pm 5\text{ mA}$ , $R_L = 1.9\text{ k}\Omega$ , $V_{CC} = 5\text{ V}$	$t_{on}$		2		$\mu\text{s}$
Turn-off time	$I_F = \pm 5\text{ mA}$ , $R_L = 1.9\text{ k}\Omega$ , $V_{CC} = 5\text{ V}$	$t_{off}$		25		$\mu\text{s}$

<b>SAFETY AND INSULATION RATINGS</b>						
PARAMETER	TEST CONDITION	SYMBOL	MIN.	TYP.	MAX.	UNIT
Climatic classification (according to IEC 68 part 1)				55/100/21		
Comparative tracking index		CTI	175		399	
$V_{IOTM}$			10000			V
$V_{IORM}$			890			V
$P_{SO}$					400	mW
$I_{SI}$					275	mA
$T_{SI}$					175	$^{\circ}\text{C}$
Creepage distance	standard DIP-4		7			mm
Clearance distance	standard DIP-4		7			mm
Insulation thickness, reinforced rated	per IEC 60950 2.10.5.1		0.4			mm

**Note**

- As per IEC 60747-5-5, this optocoupler is suitable for "safe electrical insulation" only within the safety ratings. Compliance with the safety ratings shall be ensured by means of protective circuits.

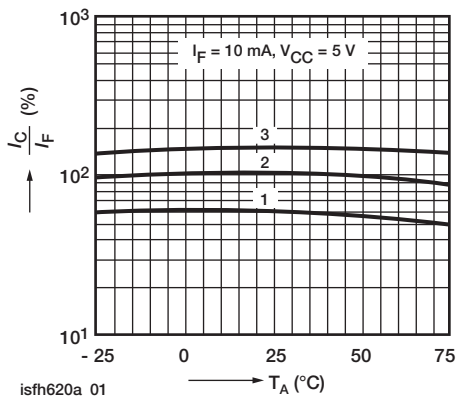
**TYPICAL CHARACTERISTICS** ( $T_{amb} = 25\text{ }^{\circ}\text{C}$ , unless otherwise specified)


Fig. 2 - Current Transfer Ratio (CTR) vs. Temperature

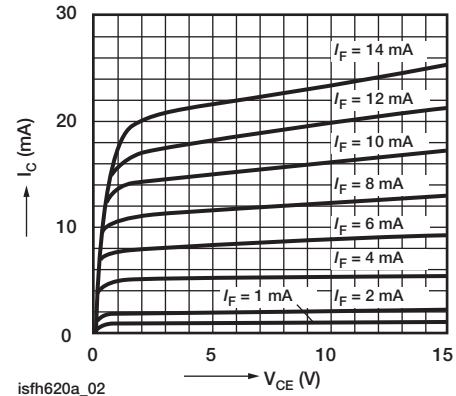


Fig. 3 - Output Characteristics (Typ.) Collector Current vs. Collector Emitter Voltage

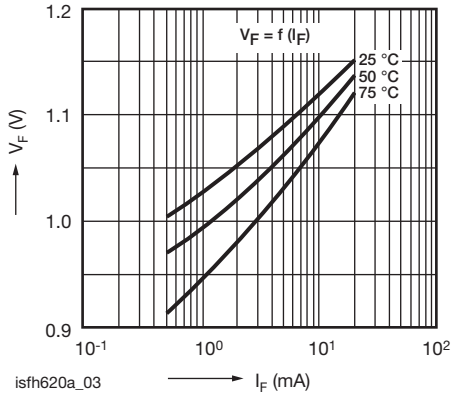


Fig. 4 - Diode Forward Voltage (Typ.) vs. Forward Current

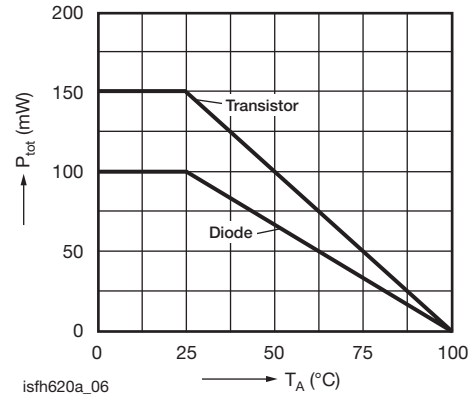


Fig. 7 - Permissible Power Dissipation vs. Ambient Temperature

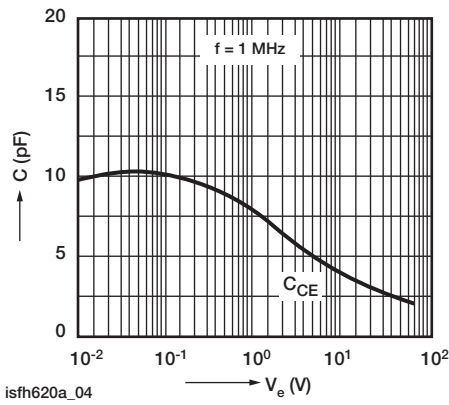


Fig. 5 - Transistor Capacitance (Typ.) vs. Collector Emitter Voltage

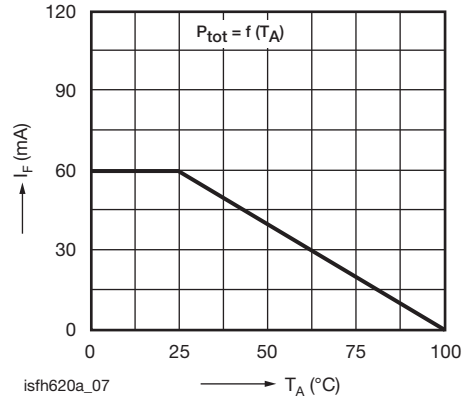


Fig. 8 - Permissible Diode Forward Current vs. Ambient Temperature

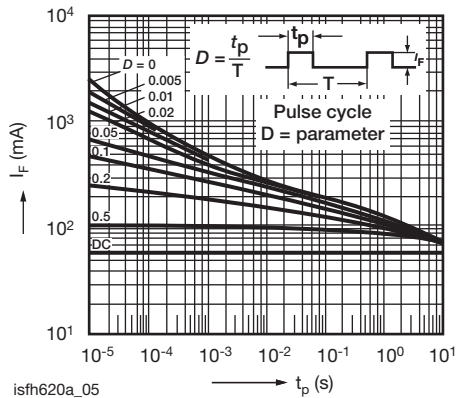
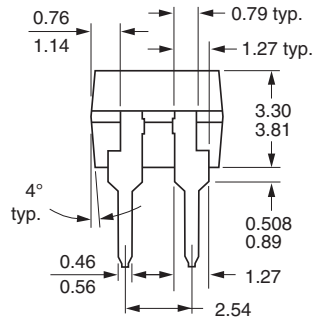
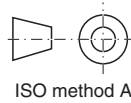
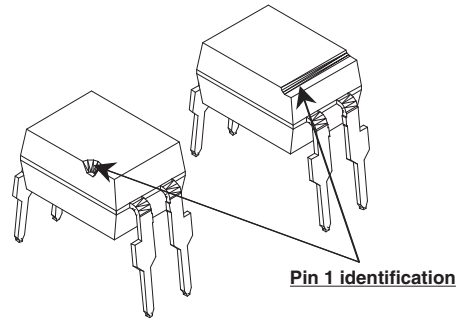
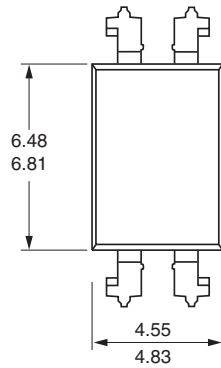


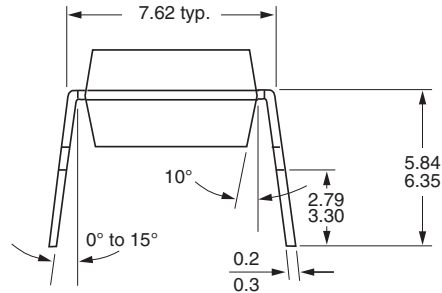
Fig. 6 - Permissible Pulse Handling Capability Forward Current vs. Pulse Width



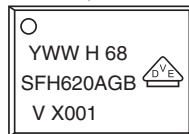
## PACKAGE DIMENSIONS in millimeters



i178027-8



## PACKAGE MARKING (example of SFH620AGB-X001)



### Note

- The VDE logo is only marked on option1 parts.



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